

principles of synthetic composition were borrowed from the Old World."

The lecture notes are unfortunately somewhat scrappy, and Prof. Elliot Smith apologises for the circumstances which led both to this defect and to the not infrequent repetitions. The book also lacks an index, which would add much to its usefulness. It is, however, a veritable mine of information on the subjects with which it deals, with numerous references to literature, and science is indebted to the John Rylands Library for undertaking the publication.

EUGENICS.

- (1) *Lectures on Sex and Heredity delivered in Glasgow, 1917-18.* By F. O. Bower, J. Graham Kerr, and W. E. Agar. Pp. vi+119. (London: Macmillan and Co., Ltd., 1919.) Price 5s. net.
- (2) *Eugenics and Environment.* By Prof. C. Lloyd Morgan. Pp. 82. (London: John Bale, Sons, and Danielsson, Ltd., 1919.) Price 2s. net.
- (3) *La Sélection Humaine.* By Prof. Charles Richet. (Bibliothèque Scientifique Internationale.) Pp. iii+262. (Paris: Librairie Félix Alcan, 1919.) Price 6.60 francs.

THESE three books illustrate three somewhat different methods of setting the problem of eugenics before the general reader. The aim of the excellent little book by Prof. Bower, Prof. Graham Kerr, and Dr. Agar is to set forth the indispensable facts and principles, and leave the reader to draw the moral. It is not perhaps intended to deal with eugenics at all, but it is one which enthusiasts for eugenic propaganda will find very valuable. It consists of six lectures on the more elementary facts of sex, reproduction, and heredity in plants and animals. The first four lectures, two on plants and two on animals, deal with the subject in the two kingdoms in similar fashion, beginning with examples of reproduction and conjugation (syngamy) in the Protista, and passing through the simpler Metaphyta and Metazoa to the more complex phenomena of the highest plants and animals. No one who has a natural interest in living things, but has had no systematic training in biology, can fail to find these lectures interesting; those on plants are perhaps unnecessarily technical here and there, but with the assistance of the excellent illustrations any reasonably educated person should find them easy and interesting to read.

In the last two lectures Dr. Agar takes up the subject of heredity, begins with the phenomena of fertilisation, cleavage, and the early segregation of the germ-cells in Cyclops as an introduction to the conceptions of soma and germ-plasm and the material basis of inheritance, and then proceeds to give a short but lucid account of Mendel's law. In the last lecture he takes up heredity in Man. He points out that, since the characters in Man which are known to follow Mendel's law are comparatively few, and in general of small practical importance, human heredity must be studied in

practice chiefly by the statistical methods of the biometric school. Of these he gives a lucid elementary description, illustrated by actual examples taken from the papers of Pearson, Heron, Schuster, and others, and shortly points out the bearing of the facts on eugenic proposals.

(2) Prof. Lloyd Morgan's little book is frankly an elementary text-book of eugenics. It deals with variation in human characters as illustrated by the normal curve of error, the principles of correlation, and the method of finding the correlation coefficient, very shortly with Mendelian heredity, and finally with acquired characters, selection, and the relation of biological characters to social tradition and civilisation. It is written in a pleasant and almost colloquial style, but suffers not infrequently from a certain obscurity of diction—e.g. in describing a correlation table (p. 33): "Along the left-hand vertical side the stature of the sons is given in ascending order read downwards" (our italics). Again, on p. 32 a misleading definition of perfect correlation is given, which is corrected at the bottom of the same page, a treatment which does not conduce to clearness. On p. 47 there is, doubtless by a slip, the misleading statement: "If blue eyes mate with brown eyes, one child in four may be blue-eyed." We feel also that the booklet suffers from being illustrated by purely imaginary examples the simplicity of which may give a false impression. Dr. Agar's account of biometric methods compares favourably with it in this respect. Nevertheless, it is in most respects an admirable elementary introduction to the subject, such as might well be used by those who wish to follow it up more fully by further reading.

(3) Prof. Richet's book has more of the character of an essay. It does not profess to set forth specific facts, but takes the facts for granted, and discusses the conclusions to be drawn from them. The main thesis of the author is that if selection can do such great things with domestic animals and plants, it could, if applied, do equally great things with man, and that the only hope for mankind in the future is in its application. The aim of life is happiness; progress is the increase of total happiness; this can be gained through science alone; it is limited only by the limits of the human mind, and these limits might be almost indefinitely extended by suitable selection. Selection must be of several kinds. In the first place, the white race is indisputably superior, and crossing with black or yellow gives bad results. All race-crosses must therefore be prohibited. Within the white race all defectives must be prevented from reproducing; seriously defective infants must not be allowed to live, and those found defective in later life must be segregated. Finally, positive encouragement must be given to marriage of the superior, especially between those superior in the same respect. The author's enthusiasm leads him at times to rather wild statements. He calls deaf-mutes (*sourds-muets*) "ces ébauches d'humanité, ces produits disgraciés . . . ces pauvres avortons," words which can only dis-

gust those who know the brilliant gifts of some who are thus afflicted. He states categorically that the mental improvement due to education is transmitted to offspring, and recommends late marriage of the highly educated in order that the effects of education may be more fully handed on. And neither Prof. Richet nor Prof. Lloyd Morgan seems to realise the extreme difficulty of eliminating an undesirable character if it is recessive in inheritance. In a stable population, if 1 per cent. show a recessive character, 18 per cent. will bear this character concealed by the corresponding dominant, and by preventing the reproduction of the 1 per cent. in which the recessive is homozygous, only very slow progress will be made in eliminating it. Prof. Richet is an enthusiast for eugenics, and has written an entertaining book, but one which is scarcely sufficiently abreast of modern work on heredity.

L. D.

OUR BOOKSHELF.

Essays in Common-sense Philosophy. By C. E. M. Joad. Pp. 252. (London: The Swarthmore Press, Ltd., 1919.) Price 8s. 6d. net.

IF any man of science, perplexed at the disturbing challenge which philosophy throws down to the assumptions as to plain matter of fact on which science rests, wants comfort and support for his intellectual framework from within philosophy itself, he will find and certainly enjoy it in the delightfully clear essays of Mr. Joad. It is a somewhat unusual thing for a young writer to make his *début* in philosophy by rejecting every temptation to paradox and any attempt to startle the "plain man," and setting himself the apparently easy but really very difficult task of convincing the "plain man" that his views about the universe are not likely to be very far removed from truth. Yet this is what Mr. Joad sets out to do.

Mr. Joad is not a very trustworthy guide when he discusses famous philosophical theories. He adopts too easy a classification, with the consequence that we find ourselves in strange company. All philosophers, past and present, are in his view representationists, solipsists, or realists. But this does not in the least spoil our enjoyment of the concise and easy way in which the writer finds himself at home in philosophy, of the keenness of his wit, and of the dexterity of his cut and thrust. There is only one of us who comes in for unstinted praise—Prof. Dawes Hicks—and we believe he does not recognise his theory in Mr. Joad's exposition. The rest of us—Bergsonians, pragmatists, absolutists—are all alike well trounced.

There is one thing in Mr. Joad's own view, however, which is very puzzling, not to say disconcerting. He tells us that sensible objects exist "very much" as we know them. But why not altogether so? If there is any difference at all, why is he so confident it can only be a very little one?

H. W. C.

NO. 2614, VOL. 104]

Modern Engineering Workshop Practice: A Text-book for the Use of Engineering Students, Apprentices, and Engineers engaged in Practical Work. By Herbert Thompson. (Griffin's Scientific Text-books.) Pp. xi + 328. (London: Charles Griffin and Co., Ltd., 1919.) Price 9s. net.

THIS book is an attempt to give a fairly comprehensive view of modern engineering workshop practice, and includes sections dealing with general methods and machines, and others dealing with special processes and machines, such as turret lathes, spiral milling, grinding, hardening, tempering, annealing, autogenous and thermit welding, and soldering and brazing. The author is quite at home in these branches. The descriptions are clear, and whilst many of the illustrations are half-tone reproductions of photographs of machines and appliances, there is a sufficient number of line drawings to enable the reader to understand the construction. The author is not so happy in chap. i., which deals with materials. Thus, on p. 3 we read, under the paragraph heading "Malleable-iron Castings": "If an iron casting, made out of the right kind of pig iron, be heated to a red heat in an iron box surrounded by some carbonaceous material for from 12 to 24 hours, the surface of the material becomes converted into a form of steel. The casting then has lost its extreme brittleness, and becomes more or less malleable. The castings are generally embedded in red hæmatite." In view of this statement, it is of interest to note that later on (p. 229), in dealing with case-hardening, the author shows that his knowledge is sound, as regards both the process and the changes which take place during the progress of case-hardening. Despite blemishes of this kind, the young engineering student will find much that is instructive and of interest in the book.

Science and War: The Rede Lecture, 1919. By the Rt. Hon. Lord Moulton. Pp. 59. (Cambridge: At the University Press, 1919.) Price 2s. 6d. net.

LORD MOULTON'S lecture gives a striking picture of the manner in which the methods of warfare have been transformed by the application to military purposes of the results of the rapid growth of chemical and physical knowledge and the advances in engineering and medical science during the last half-century. Not unnaturally, a considerable part of the discourse is devoted to the subject of explosives, on which the lecturer can speak with special authority, and the warning which he gives as to the importance of establishing the manufacture of nitric acid from atmospheric nitrogen in this country is one that deserves serious attention. Lord Moulton's final conclusion is that man, "endowed with all the powers that science has given him, will be self-destructive unless his social instincts . . . become sufficiently strong to induce him voluntarily to submit to those powers being fettered." "It is easy to criticise the League of Nations, but let us never forget that some combined action of that type is necessary."